IN THE CLAIMS

For the convenience of the Examiner, all pending claims of the present Application are shown below in numerical order whether or not an amendment has been made and applying the revised amendment practice of 37 CFR 1.121.

1. (Original) A method for controlling operational weld parameters of a welding-based deposition process, comprising:

generating a solid model representing a three-dimensional part on a computer;

generating a plurality of electronic two-dimensional layers based on the solid model;

identifying a path of material deposition based on the electronic two-dimensional layers, the path comprising a plurality of deposition points;

determining a geometrical factor for each deposition point, the geometrical factor defined by a ratio of an actual volume of material around each deposition point to a theoretical volume of material around each deposition point; and

automatically adjusting, during material deposition for a respective deposition point, one or more parameters of the welding-based deposition process based on the geometrical factor for the respective deposition point.

2. (Original) The method of Claim 1, wherein generating the plurality of electronic two-dimensional layers comprises creating a plurality of CAD data files.

3. (Original) The method of Claim 1, wherein determining the geometrical factor for each deposition point comprises:

digitizing a volume of the solid model to represent the solid model as a three dimensional matrix of volumetric points;

assigning each volumetric point a first value if material exists at that volumetric point or a second value if material does not exist at that volumetric point;

identifying the actual volume of material around each deposition point based on the matrix; and

identifying the theoretical volume of material based on a theoretical hemisphere defined by a predetermined heat affected zone that is based on an initial set of parameters for the welding-based deposition process.

4. (Original) The method of Claim 3, wherein the three dimensional matrix comprises a range of volumetric points between 50 and 150 volumetric points per inch.

5. (Original) The method of Claim 1, wherein the welding-based deposition system comprises a laser-based welding deposition process.

6. (Original) The method of Claim 1, wherein the welding-based deposition system comprises a plasma-based welding deposition process.

7. (Original) The method of Claim 1, wherein the one or more parameters of the welding-based deposition process is selected from the group consisting of a current, a laser power, and a plasma power.

8. (Original) Logic encoded in media for controlling operational weld parameters of a welding-based deposition process, the logic operable to:

generate a solid model representing a three-dimensional part on a computer;

generate a plurality of electronic two-dimensional layers based on the solid model;

identify a path of material deposition based on the electronic two-dimensional layers, the path comprising a plurality of deposition points;

determine a geometrical factor for each deposition point, the geometrical factor defined by a ratio of an actual volume of material around each deposition point to a theoretical volume of material around each deposition point; and

automatically adjust, during material deposition for a respective deposition point, one or more parameters of the welding-based deposition process based on the geometrical factor for the respective deposition point.

9. (Original) The logic encoded in media of Claim 8, the logic further operable to create a plurality of CAD data files.

10. (Original) The logic encoded in media of Claim 8, the logic further operable to:

digitize a volume of the solid model to represent the solid model as a three dimensional matrix of volumetric points;

assign each volumetric point a first value if material exists at that volumetric point or a second value if material does not exist at that volumetric point;

identify the actual volume of material around each deposition point based on the matrix; and

identify the theoretical volume of material based on a theoretical hemisphere defined by a predetermined heat affected zone that is based on an initial set of parameters for the welding-based deposition process.

11. (Original) The logic encoded in media of Claim 10, wherein the three dimensional matrix comprises a range of volumetric points between 50 and 150 volumetric points per inch.

12. (Original) The logic encoded in media of Claim 8, wherein the welding-based deposition process comprises a laser-based welding deposition process.

13. (Original) The logic encoded in media of Claim 8, wherein the welding-based deposition process comprises a plasma-based welding deposition process.

14. (Original) The logic encoded in media of Claim 8, wherein the one or more parameters of the welding-based deposition process is selected from the group consisting of a current, a laser power, and a plasma power.

15. (Original) A method for controlling operational weld parameters of a welding-based deposition process, comprising:

generating a solid CAD model representing a three-dimensional part on a computer;

electronically slicing the solid CAD model into a plurality of electronic two-dimensional layers;

identifying a path of material deposition based on the electronic two-dimensional layers, the path comprising a plurality of deposition points;

digitizing a volume of the solid CAD model to represent the solid CAD model as a three dimensional matrix of volumetric points;

assigning each volumetric point a first value if material exists at that volumetric point or a second value if material does not exist at that volumetric point;

identifying an actual volume of material around each deposition point based on the matrix;

identifying a theoretical volume of material based on a theoretical hemisphere defined by a predetermined heat affected zone that is based on an initial set of parameters for the welding-based deposition process;

determining a geometrical factor for each deposition point, the geometrical factor defined by a ratio of the actual volume of material to the theoretical volume of material; and

automatically adjusting, during material deposition for a respective deposition point, one or more parameters of the welding-based deposition process based on the geometrical factor for the respective deposition point.

16. (Original) The method of Claim 15, wherein the three dimensional matrix comprises a range of volumetric points between 50 and 150 volumetric points per inch.

17. (Original) The method of Claim 15, wherein the three dimensional matrix comprises approximately 100 volumetric points per inch.

18. (Original) The method of Claim 15, wherein the welding-based deposition system comprises a laser-based welding deposition process.

19. (Original) The method of Claim 15, wherein the welding-based deposition system comprises a plasma-based welding deposition process.

20. (Original) The method of Claim 15, wherein the one or more parameters of the welding-based deposition process is selected from the group consisting of a current, a laser power, and a plasma power.

21. (Original) A system for controlling operational weld parameters of a welding-based deposition process, comprising:

means for generating a solid model representing a three-dimensional part;

means for generating a plurality of electronic two-dimensional layers based on the solid model;

means for identifying a path of material deposition based on the electronic two-dimensional layers, the path comprising a plurality of deposition points;

means for determining a geometrical factor for each deposition point, the geometrical factor defined by a ratio of an actual volume of material around each deposition point to a theoretical volume of material around each deposition point; and

means for automatically adjusting, during material deposition for a respective deposition point, one or more parameters of the welding-based deposition process based on the geometrical factor for the respective deposition point.